

Graduate Thesis Topics for AY2006

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Embedded Processor Design and Evaluation

- Microprocessors on portable devices need to run various applications under the tight constraint on hardware resource and power consumption
- Performance requirements are rapidly increasing by multimedia applications (still and movie pictures, music player, GPS)
- Java Virtual Machine (JVM) is another burden, which has a quite different architecture than current microprocessors.
- Analyze portable device applications and discover performance bottleneck and hardware/software solutions

Collaborators: Dr. Okuyama, Dr. Guo, Prof. Sedukhin

Performance Analysis of Server Workload

- High-performance server systems are running various non-scientific applications: web servers, on-line transaction processing (OLTP), decision support systems.
- These applications have quite different characteristics from scientific applications (database access, numerous short requests from network-connected user terminals, etc).
- Using open-source implementation of industrial standard benchmark programs (OSDL-dbt suites), try to analyze the behavior of server workloads.
- Possible topics: development of analytical models of workload, automation and visualization of simulation.

Low Power Design of Sensor Network

- Sensor Network: a large number of sensor nodes distributed in a field and communicate each other autonomously.
- Each node consists of a microcontroller, memory, wireless network interface, and sensors.
- Requirements: Large number of nodes (low cost per node), low power consumption (for longer lifetime), self-organization (find neighbor nodes and configure network, etc).
- Possible topics: designing virtual machine for sensor node reprogramming, protocol for network self-organization.

Collaborators: Prof. Miyazaki and Dr. Bleakley (UCD, Ireland)